CLAIMS

<u>What is claimed is:</u>

1.   A transmission mode detector for digital receivers to detect the transmission mode of transmission frames, comprising:

5   a RF tuner for receiving a RF signal and generating an IF (Intermediate Frequency) signal;

an envelope detector for filtering the IF signal and generating a rough envelope waveform;

a slicer for quantizing the rough envelope waveform into a binary signal with high

10   and low potentials;

a glitch remover for removing glitches in the binary signal and generating an envelope signal;

an A/D (Analogue-to-Digital) converter for sampling and digitizing the IF signal and generating a digital signal;

15   an I/Q (In-phase/Quadrature) De-multiplexer for extracting in-phase and quadrature signals in OFDM (Orthogonal Frequency Division Multiplex) symbols from the digital signal; and

a mode detection unit for detecting the transmission mode according to the time period of the envelope signal and the auto-correlation of the OFDM symbols.

20   2.   The transmission mode detector of claim 1, wherein the envelope detector includes:

a diode having a positive terminal for receiving the IF signal; and

a RC network having one terminal connecting to the negative terminal of the diode and the other terminal grounded.

25   3.   The transmission mode detector of claim 2, wherein the slicer is a comparator having a positive terminal connecting to the negative terminal of the diode and a negative terminal connecting to a reference voltage for generating the envelope waveform.

4.   The transmission mode detector of claim 1, wherein the mode detection unit

30   computes the time period of the envelope waveform and the transmission mode is

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determined to be the mode II or III if the time period is 24ms, the mode IV if the time period is 48ms, and the mode I if the time period is 96ms.

5. The transmission mode detector of claim 1, wherein the correlation function in the mode II is

$$c_j = \left| \sum_{i=j}^{j+\Delta_2} y2(i+N_2) \cdot y2^*(i) \right|,$$

where $N_2 = 512$ and $\Delta_2 = 126$; the correlation function in the mode III is

$$d_j = \left| \sum_{i=j}^{j+\Delta_3} y2(i+N_3) \cdot y2^*(i) \right|,$$

where $N_3 = 256$ and $\Delta_3 = 63$; and the maxima C_k and D_k of the sequences $\{c_0, c_1, \ldots, c_{N_2+\Delta_2-1}\}$ and $\{d_0, d_1, \ldots, d_{N_3+\Delta_3-1}\}$, respectively, are the auto-correlations of the IF signal computed based upon the modes II and III, respectively.

6. The transmission mode detector of claim 5, wherein the auto-correlations, C_k and D_k, for successive N symbols are accumulated, respectively, to avoid the false detections when the S/N ratio of the IF signal is too low; that is, $C = \sum_{k=0}^{N-1} C_k$ and $D = \sum_{k=0}^{N-1} D_k$; and, therefore, the transmission mode is the mode II if $C > D$ and the mode III if $C < D$.

7. The transmission mode detector of claim 5, wherein the transmission mode detector uses the auto-correlations of the OFDM symbols under different modes (I, II, III, and IV) to detect the transmission mode.

8. The transmission mode detector of claim 6, wherein the transmission mode detector uses the auto-correlations of the OFDM symbols under different modes (I, II, III, and IV) to detect the transmission mode.